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REPORT OF A CASE OF PSYCHOCHROMESTHESIA

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OF all the phenomena encountered in the study of abnormal psychology few are of more interest than that rather rare phenomenon — psychochromesthesia, or "colored thinking." Doubly interesting does it become when associated with the synesthesia of "colored hearing," or, as the French term it, "l'audition colorée." The studies of Galton, Locke, Albertoni, Peillaube, and Harris are familiar to most students of abnormal psychology, and occasionally the technical journals report a case. But the reported cases are not so numerous as to pass unnoticed. It is hoped the report of the following case will add something to the already growing interest in this peculiar condition.

M. C. O., the seer in this case, is an unusually intellectual and charming young matron of thirty years of age. The mother of two children, she has lost none of her love of youthful things, nor has the quality of her intellectual life deteriorated in the least. To be mildly critical, she is far above the average in vigor of intellect, and excepting her decidedly mystical turn of mind, a woman of no mental bias of any kind. Just what part heredity plays in this psychic peculiarity of hers it has been impossible to determine, but undoubtedly that factor must be taken into account. One of her sisters thinks in color, while another does not, and when a child it was her custom to occasionally pound her less fortunate sister because she could not see and enjoy the wonderfully brilliant display of color so constantly present before her own eyes. She does not

remember a time when she was not used to thinking in color, and as a child to shut her eyes and see ring after ring of gay colors whirling in mystic mazes through the air was one of her chief pleasures, and so realistic were they, and so vivid, that her mother on more than one occasion spanked her most soundly for what she thought wilful fabrications. These concentric rings were always composed of a central disc of yellow, a second and surrounding ring of red, another of green, this latter color being present in most of the chromatic thinking of this psychochromesthete.

In the association of colors with persons, M. C. O. does not associate color with all people, most people appearing to her as black, her psychochrome for space. Only certain persons produce the sensation of color, and then only following the visualizing of that person. Thus, when first entering the presence of M. C. O., she visualizes me, recognizes me, and at once becomes blind to all but a flash of clear and beautiful yellow. So accustomed is she to this phenomenon, that unless it is referred to she never alludes to it. In fact, few if any of her acquaintances are aware of this peculiarity of hers. Her husband, myself, religion, God, Buddha, priests, the word music and certain mystic symbols always appear to her as yellow. Those symbols showing an opening of any kind, as the circle, triangle, or swastika, are yellow, because, as she expresses it, " a flood of yellow light flows through them." To the contrary, those symbols presenting straight lines are always seen as white. As examples, the swastika, the circle ○, the triangle △ and the letter "S" are always visualized as yellow, while the cross + and the letters "T" and "I" are invariably white. A serrated line like this ⩘⩘⩘, no matter when seen or in what connection, always brings with it the vivid vision of sea water in that peculiar shade of green always referred to as " angry green." Her little daughter is red, and her son blue and white.

For the months, hours, and numbers M. C. O. has no psychochrome, but for the days of the week, excepting Thursday and Saturday, she has. Monday is green, Tuesday red, Wednesday and Sunday purple, and Friday black. For the hours she has no psychochrome only as they fall within the broad limits of morning, afternoon, and evening.

The word " morning " is visualized as green, to think of it is to see green, while the afternoon is red, and the evening always amethyst, passing into the darker shades of purple as night approaches. To think of space is to be plunged at once into utter darkness. An interesting feature of this case is that, as a rule, letters, people, and objects generally that have no distinctive psychochrome are not visualized as being in themselves colored, but with a background of color. There are, however, certain exceptions to this rule, as, for instance, the letter " L," which is not only colored in itself a clear green, but brings with it the actual vision of a green budding tree. Happiness, as a word or as an emotion, produces the psychochrome of green; all desire is green, storm is green, as is also the letter " A." " E " is red, " B " and " C " are purple.

The synesthesia of " color hearing " is rather pronounced in the case of M. C. O. Certain musical selections are invariably associated with certain colors. Chopin is purple, Mozart green, Wagner red. For the "Intermezzo" from Cavalleria Rusticana, she has a passionate fondness and always visualizes a purple iris; while Schubert's " Serenade " brings instantly into view a rainbow in all its gorgeous hues, and, strangest of all, the sensation of having swallowed it. In music, the dominant is red, while the low tones are always purple. Any loud noise is red; if an unpleasant voice, the green of angry water. The only change that has taken place in the psychochromes in this case is that of anger, which in the childhood of M. C. O., was red, but now a " dull green."

Odors, too, have their appropriate psychochrome. Musk is always gold and brings with it the vision of dark faces, and the odor of carnations causes clouds of crimson to pass before the mind's eye.

In the life of our seer, color has ever played the most important rôle. To close her eyes is to at once usher in a giant kaleidoscope with its never ending play of color. In additon to this there are two set pieces that alternate and which, when her mind's eye is not busied with those visions for which there is some objective cause, at once assume the center of the psychic stage. The first of these pictures was

present at so early an age that she does not remember a time when she did not see it. There is a green hill surmounted by two broken marble columns, with the blue sea lapping its feet. The other, more complex and elaborate, presented itself at a much later date, and is of a Moorish doorway leading into a courtyard cool with the spray of splashing water and sweet with the scent of pomegranate flowers. A giant black in garments of snowy white stands guard over all. These pictures are present only when there is a call to fill a vacant frame, much as we see the painted drop in our theaters.

Beyond the very interesting phenomena of chromatic thinking and hearing, M. C. O. presents certain characteristics of the psychic, or medium. She has had several premonitory dreams,— always in their appropriate psychochromes,— and on several occasions has written automatically.

CONTRIBUTION TO THE PSYCHOLOGY OF GENERAL PARESIS

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IT is an opinion among general practitioners, shared even by a certain number of specialists, that the general paretics admitted to the asylums are completely demented, that all their ideas are absurd, that they are unable to judge the simplest things.

This is true in regard to the paretics who are in the last stage of the disease. In cases in which the disease is not of very long duration a psychological study of the patients shows that if their mental capacities are reduced, they are able, however, to answer correctly a great number of questions. A conversation of a few minutes is not sufficient to acquire this conviction; a paretic who answers very badly the first questions, is disoriented in time and place, who claims to be a millionaire, God, etc., may show after a careful examination a considerable intellectual store. To be able to judge the mental state of a paretic it is necessary to observe him during a few days, to waken him from his dulness, to gain his confidence.

The study of the psychology of the paretics has been somewhat neglected. All the abnormalities of their mental life are explained by the intellectual deterioration. This seems to be so obvious that relatively little has been done to prove it.

Desiring to elucidate the pathogenesis of the delusions in general paresis, I started with the study of their psychology. The examination of their capacity of judging the length, time, and value of objects gave me some interesting results, which I desire to report, without touching at present the problem of delusions.

The patients who have been used for these experiments have all been in the hospital for a considerable time. This excludes the preparalytic period and presumes that we have to deal with somewhat advanced cases.

Taking into consideration the poor education of the majority of the patients, I chose very simple tests. Before starting the experiment I took care to prepare the patient for it. I spoke with him frequently, questioned him about his health, his future, etc. This awakened the spontaneity of the patient and he co-operated afterwards more willingly and with greater efficiency.

At the beginning of every experiment, I explained once or a few times what I expected the patient to do. Only after being quite sure that he grasped the explanation I proceeded to the test. For a better understanding of the results it is necessary to have a general idea of the clinical history of the patients, therefore I give a brief summary of the ten paretics who have been used for the study.

Patient 1: Forty years old; bricklayer; intemperate in habits.

Onset of psychosis in May, 1906; admitted to the hospital in December, 1906.

Pupils small, unequal, do not react to light; accommodation is good. Knee-jerks are absent. Tremor of tongue and fingers; slurring and sticking speech. Megalomanic trend of ideas; he is King of England, millionaire, has a great number of houses, four gold ships. Orientation, memory, calculation, and judgment very poor.

Patient 2: Thirty-nine years; weigher.

Onset of psychosis in April, 1907; admitted to the hospital in October, 1907.

Unequal pupils, reacting poorly to light, coarse tremor of tongue and fingers, exaggerated knee-jerks, impaired speech and writing; positive spinal puncture.

Megalomanic ideas: "I've got $170,000,000 in cash besides the gold mines. I own two hundred and fifty horses." Orientation is most defective; retention poor, memory hazy, insight and judgment very defective.

Patient 3: Forty-nine years; grocer.

Pupils are unequal and contracted; the right is the smaller and reacts sluggishly to light, while the left reacts promptly; both react to accommodation. Exaggerated knee-jerks, tremor of tongue and fingers, defective speech and writing, positive lumbar puncture.

Ideas of grandeur; he has about $1,000,000, and also diamonds, watches, and rings; he is Kaiser of Germany. Memory impaired and judgment poor.

Patient 4: Forty-one years; chemist's assistant.

Onset of psychosis four years ago; admitted to the hospital in March, 1908.

Permanent paralysis of the third cranial nerve. The pupils do not react to light, unequal exaggerated knee-jerks, defective speech and writing, marked tremor of tongue and fingers.

On admission patient was megalomanic. He said that his name was Rockefeller, Astor. "I've got about $20,000,000, and I will have a whole lot more. I've a yacht." Poor memory and insight. At the present time the patient has given up his expansive ideas.

Patient 5: Thirty-three years; clerk; intemperate in habits.

Onset of pychosis in November, 1905, admitted to Central Islip, in April, 1906, and to M. S. H. in May, 1908.

Pupils unequal, contracted, right does not react to light, left reacts very sluggishly; knee-jerks absent; fine tremor of tongue and fingers; spinal puncture positive.

Patient is emotionally elevated; vague auditory hallucinations (hears spirits talking), mystic ideas ("I am God, I am the Father; I never had a father on earth, my Father is up above in Heaven.")

Memory is good, extent of school knowledge fair, poor insight and judgment.

Patient 6: Forty years; musician.

First peculiarity six months ago; admitted to the hospital in January, 1909.

Pupils are unequal, react sluggishly to light and normally to accommodation, exaggerated knee-jerks; fine tremor of tongue and fingers. Defective speech and writing.

Patient feels "very well." Has unusual ability as musician, poet, business man, and politician.

Extent of school knowledge impaired, insight deficient, judgment poor.

Patient 7: Forty-six years; carpenter.

Onset of psychosis in December, 1907; admitted in August, 1908.

Pupils unequal, do not react to light; exaggerated knee-jerks, tremor of tongue and fingers; slurring speech; positive lumbar puncture.

Patient is emotionally depressed, disoriented for time and place; defective memory; impaired judgment; no hallucinations or delusions.

Patient 8: Forty years; musician.

Onset of psychosis in September, 1907; admitted in February, 1908.

Pupils unequal and react sluggishly to light; knee-jerks exaggerated; slurring and ataxic speech. Delusions of grandeur (is the greatest musician America ever saw), and ideas of persecution (people are after him because they are jealous); poor memory and judgment.

Patient 9: Thirty-three years; barber.

Onset of psychosis in 1906, admitted in February, 1908.

Pupils unequal, do not react to light, deep reflexes exaggerated, tremor of tongue and fingers; defective speech and writing.

Patient is emotionally unstable and childish; no delusions or hallucinations, poor retention and grasp; defective judgment and insight.

Patient 10: Forty years, salesman.

Onset of psychosis in 1905; admitted in October, 1906.

Pupils unequal, irregular, react to light and accommodation, exaggerated knee-jerks; fine tremor of tongue, fingers, and facial muscles; defective speech and writing.

Patient is emotionally elated, somewhat euphoric; no hallucinations nor delusions; memory grasp, judgment, and insight poor.

ESTIMATION OF SPACE

Wizel,* on the basis of his experiments, comes to the conclusion that general paretics have no idea of distances, and therefore in estimating length, make absurd statements. One of his patients measured the length of a room and found it 10½ yards long; already a minute afterwards he had forgotten the result and said that the room was 4,800 yards long.

Before relating my personal results I desire to draw

*Neurol. Centralbt., 1903, No. 14, 15.

attention to the fact that in the appreciation of length normal individuals easily make little mistakes. The errors are greater, the greater the distance to be estimated.

The following questions have been proposed to the patients:*

1. How long is this room? (10 feet.)
2. How broad is it? (13 feet.)
3. What is its height? (12 feet.)
4. What is the height of the attendant? (5½ feet.)
5. How long is his left arm? (2½ feet.)
6. How long is this table? (5 feet.)
7. How broad is it? (2½ ft.)
8. What is the distance from this place to the river? (Quarter of a mile.)

The following are the answers of the patients:

No. of Patient	No. of Question							
	1	2	3	4	5	6	7	8
1	20 ft.		6 ft.		3 ft. 6in.			1 mile
2		20 ft.	50 "	10 ft.	3 ft.	8 ft.	5 ft.	200 ft.
3	8 "	8 "	15 "	5 "	2 "	3½	2½	200 "
4	18 "	20 "	25–30	12 "	3 "			200 "
5	18 "	18 "	18 ft.	5ft.6	2½	6 ft.	3 ft.	300 "
6	18 "	18 "	15 "	5 ft.	2 ft.	3 ft.	2 "	1 mile
7	12 "	8–10–12	10 "	5ft.6	3 "	7–8	½–4	1½ mile
8	25 "	12 ft.	36 "	6 ft.	1½	6 ft.	1½	60,000 ft.
9	20 "	20 "	20 "	6 "	10–12 in.	12 "	6 ft.	100 ft.

These samples show clearly that the exaggerations are very far from being as important as Wizel states. It is easy to see that in the estimation of the distance from the hospital to the river — the greatest length — the errors are the most important. The greatest number is given by the patient No. 8; the same patient answers the other questions fairly well. As I already stated above, the estimation of long

*Certain patients could not be questioned for any length of time; therefore, to some of them I only gave a part of the questionaire.

distances is difficult for normal individuals and it must be, of course, still more difficult for demented patients.

I have also controlled the observations of Wizel concerning the drawings of general paretics. This author states that the patients are unable to draw regular figures and explains this by the defective judgment of distances. All my patients (except one who is very ignorant and never in his life tried to make any drawings) could do it in a very satisfactory way, some of them even very well.

ESTIMATION OF THE VALUE OF OBJECTS

One would expect a priori that paretics, especially those who are megalomanic, have no idea of the value of objects. But it is not so in reality. They have sometimes even a tendency to diminish the prices. The objects shown to test this were the same in all experiments.

Object	No. of Patient									
	1	2	3	4	5	6	7	8	9	Price
Knife	10c	$1	50c	25c	35c	25c	25c	35c	$1½	25c
Watch ...	$18	$3		$10	$15	$3–4	$10	$21–½	$6	$6
Pencil ...	5c	10c	5–10c	2c	3c	2–3c	10c	5c	5c	5c
P. book ..	5c	15c						50c		10c
C. Buttons-	$1	$1½	$1		$1½	25c	$½	$1	75	75c
Necktie ..	20c	50c		25c					65c	50c
Shirt	$2	$1½			$1¼	$1¼	$2		$1¼	$1½
Key		25c	5c	25c	50c	10c	50c	5c	75c	75c
Handk'ch'f	5c	10c	10c	15c	15c	10c	15c		25c	10c
Bed		$4								$6
Shoes			$3½	$3–4	$3½	$3	$6	$3½	$4	$4
Table				$10					$712	$6

In all these cases we do not find any absurd estimation. No patient, even among those who claim to possess hundreds of millions, pays $1,000 or $10,000 for a shirt or a necktie. The " rich " paretics pay sometimes even less than the poor.

THE MEMORY OF TIME

This is a very difficult test, time being an abstract

notion. For its evaluation, normal individuals have to use watches; otherwise the errors made can be considerable. Some of the paretics have lost completely the idea of time. They cannot tell how many seconds are in a minute and how many minutes in an hour. These patients of course cannot be used for experiments. Among the others, one group gives fairly good answers, another group overestimates the time in an absurd way. The experiments are conducted as follows. A metronome is put in movement for a certain period, and afterwards the patient evaluates the duration of this period. He has not to count the number of beats because this could allow him to get an idea of the time. To avoid this the beats have to be very rapid. The metronome is used to attract the attention of the patient. The following results have been obtained with normal individuals.

N. P. Individual	Time			
	30 sec.	2 min.	40 sec.	1 min.
No. 1	30 sec.	3 min.	1 min.	40 sec.
No. 2	25 sec.	2½ min.	32 sec.	53 sec.
No. 3	15 sec.	1½ min.	20 sec.	1½ min.
No. 4	1 min.	3 min.	1 min.	1½ min.
No. 5	2 min.	5 min.	3 min.	3 min.
No. 6	1 min.	3 min.	1½ min.	1½ min.

In the cases of paretics we obtained the following results:

Patient	Time			
	30 sec.	2 min.	40 sec.	1 min.
No. 2	10 min.	25 min.	12 sec.	20 min.
No. 3	30 sec.	30 sec.	20–25 sec.	30–45 sec.
No. 5	1½ min.	10 min.	12 min.	5 min.
No. 6	1½ min.	8–10 min.	3 min.	4–5 min.
No. 10	7 min.	30–35 min.	25 min.	20 min.

These tables show two things, first the paretics evaluate time very badly; second, there is no difference in this regard

between paretics with delusions of grandeur and without these delusions.

CONCLUSION

What can we conclude from all this? The result seems to be that paretics have during a long time an approximatively just idea about distances and the value of objects; their estimation of time is more erroneous. The errors are the same in the case of paretics with delusions of grandeur and of those without expansive ideas. We can, therefore, say that there exists no direct relationship between the genesis of delusions in general paresis and erroneous estimation of space, time, and value of objects.

CERTAIN PULSE REACTIONS AS A MEASURE OF THE EMOTIONS

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THE influence of unconscious and co-conscious (subconscious) emotional complexes or of conscious ideas associated with an emotional tone in causing certain electrical and physiological reactions, has recently attracted considerable attention. The various electrical and physiological phenomena observed seem to follow only emotional stimuli. According to recent investigators, one of the most important accompaniments of the emotions is electrical in nature, the so-called psychogalvanic reflex. In these experiments, when an electrical current is passed through the body from a galvanic cell, variations take place in this current under the influence of the emotions, of test words having an emotional tone, or of certain sensory stimuli. According to the majority of investigators, the nervous relations of the sweat glandular system is probably the chief factor in the production of these electrical reactions, the emotions inducing certain changes in the resistance of the skin to the current. Indifferent test words caused no reaction. In association tests made with identical test words, it was found that large galvanometric curves and lengthened reaction times in the associations were parallel with one another. Furthermore, it was also shown, that the electrical reactions became exhausted through frequent repetition. Prince and Peterson* demonstrated that in certain pathological conditions (multiple personality) rises in the galvanometric curves took place with test words connected with co-conscious (subconscious)

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emotional experiences which could not be voluntarily reproduced in consciousness as memory, but which may appear spontaneously in dreams or artifically in the hypnotic state. I hope to show in the course of this paper, that in certain physiological reactions (acceleration of the pulse rate) many of the same phenomena can be observed as in the psychogalvanic reflex.

The physiological accompaniments of the emotions are either vasomotor, respiratory, or secretory in nature, and comprise such phenomena as variations in the pulse rate, the blood pressure, and the respiration, or the influence of certain psychical processes upon the various secretions and motor activities of the gastro-intestinal tract. The experiments of Pawlow and Cannon have added greatly to our precise knowledge of the influence of mental states upon the functions of the alimentary canal. The phenomena observed, such as increase or failure of the secretion of the digestive juices and of cessation or acceleration of the motor activities of the stomach or intestines, were to a high degree inconstant. The same emotional stimulus was sometimes efficient and sometimes not, showing that the reactions were probably psychical in nature and not mere automatisms in the form of physiological memories. This inconstant reaction was called the "conditional reflex" by Pawlow, in contrast to the blind automatic activity of the "unconditional" in organic reflexes. The psychical nature of this conditional reflex was further established through some experiments of Nicolai.* Like the galvanic reaction, these conditional reflexes also became exhausted through constant repetition, and were markedly selective in their nature.

The effects of the emotions in the vasomotor system have long been known. These investigations, however, were limited more to the arterial tension, the form of the pulse wave, and the changes in the peripheral vasomotor dilatation or constriction, rather than to the rate of the pulse itself. With a view of investigating these various pulse phenomena in certain conscious, subconscious, and coconscious emotional states, the following systematic experiments were undertaken.

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When a subject is placed in a reclined position in a semi-darkened room, and asked to listen intently to a monotonous sound stimulus, such as the beating of a metronome*, after a short time certain phenomena will be observed. These phenomena are practically the same in all subjects. Briefly they are as follows: a sense of drowsiness with either a clearly retained or hazy memory, heaviness of the limbs and eyelids, limitation of voluntary movements, sometimes difficulty in opening the eyelids, either a muscular relaxation or a transitory cataleptic state develops in the limbs, a slowing of the respiration, and finally a diminution in the pulse rate, varying from eight to twenty beats per minute. This last may be called the rest pulse rate. It remains constant, altering only under the influence of the stimuli to be presently described. This lessening of the pulse rate has also been found to occur in hypnosis†.

In my previous publications I called the condition thus produced by listening to a monotonous sound stimulus the state of experimental or induced distraction. In many ways it seems to be analogous with the hypnoidal conditions (Sidis). It possesses a wide range of psychotherapeutic and psycho-analytic value. Suggestibility is increased in this state the same as in hypnosis, but to a more limited degree. Subconscious or suppressed experiences in this condition may flood the subjects, mind, and in states of functional amnesia it has been possible to synthetize the dissociated memories through this method‡.

After the subject has reached a stable condition, and the pulse has diminished to a constant rate, which usually takes place in about ten minutes, the subject is then in a condition for the experiment. If the subject then be asked to mentally recall an emotional experience or to intently

*I have found that the state of abstraction is best produced if the metronome is so arranged as to give fifty beats per minute.

†*E. E. Walden.*—A Plesthysmographic Study of the Vascular Conditions During Hypnotic Sleep. *American Journal Physiology*, 1900.

‡*Isador H. Coriat.*— The Experimental Synthesis of the Dissociated Memories in Alcoholic Amnesia. JOURNAL ABNORMAL PSYCHOLOGY, August, 1906. The Lowell Case of Amnesia. *Ibid*, August–September, 1907. The Mechanism of Amnesia. *Ibid*, April–May, 1909.

think of certain suggested test words having a direct relation to this experience, the pulse rate begins to rise in about five seconds and remains rapid for half a minute or more. Then it slowly sinks again, particularly if the subject be directed to cease thinking of the test word or experience. The pulse rate is very accurately taken with a stop watch. In the fear psychoses this procedure not only causes an acceleration of the pulse rate, but in some cases, particularly on recalling the original emotional experience, an abortive attack of the fear itself will be found to take place. On the contrary, ordinary intellectual problems, abstract mental exercise, painful stimuli, such as the prick of a needle or a strong faradic current, sudden noises, or indifferent stimulus test words without any emotional meaning, cause no alteration in the pulse rate. A deep inspiration will, however, cause a slight increase, as it does of the psychogalvanic curve. In any test word which causes the pulse to increase, on frequent repetition of the test word, we finally reach a point where no acceleration at all will take place; the reaction has become exhausted. The same phenomenon was found to take place in the psychogalvanic reactions and in some of Pawlow's experiments with his so-called conditional stimuli.

Experiments with emotional stimuli in the normal waking condition would also cause some variation in the pulse rate, but here the variations would be only slight. I chose the state of induced distraction for my experiments for several reasons. The pulse rate was decidedly less than normal while the subject was in this condition, the slow rate was a constant one, unaffected by ordinary sensory stimuli, and any variations from the rest pulse curve could be easily detected and counted.

Of course the pulse rate tends to decrease in any reclining position, but it is less marked than when a monotonous sound stimulus is used. The latent time between the stimulus word and the pulse rate is about five seconds. It seems necessary for the emotional state to reach a certain intensity before it can exercise any physiological reaction. In very strong emotional complexes the latent time is reduced, the pulse rate beginning to increase almost immediately

after the emotional stimulus word has been used. Between tests the time interval should be about a minute, in order that the pulse may fall to its resting state. However, if any indifferent stimulus has been used, with consequently no reaction, this time interval may be less! If parallel association experiments be made with identical test words, it will be observed that when a lengthened reaction time in the associations occurs, it corresponds with an increase in the pulse rate. The same has been shown to be true of the galvanometer. High galvanometric curves and lengthened association times run parallel with one another. As will be shown later, however, long reaction times in the association tests only took place when the words related to unconscious or conscious complexes. Subconscious complexes caused no increase of reaction time, although these same subconscious complexes could cause an acceleration of the pulse rate. This is in harmony with the observations of Prince and Peterson before alluded to, in which galvanic reactions were obtained from the subconscious processes of a subject in the same manner as from conscious experiences. It was furthermore observed in certain psychasthenic fear neuroses, that the increased pulse rate caused by emotional stimulus word or complex showed a tendency to react less markedly as the patient improved under treatment, although a sufficient interval was allowed to lapse between the individual tests, thus eliminating any exhaustion through repetition at near intervals. Of course, in these cases it might be said that only the emotional reaction improved, but a careful analysis demonstrated a parallel improvement in the entire mental condition of the subject.

Out of a mass of experiments only a few cases and curves can be given. The first curve shows the negative pulse reaction in a normal subject, when mental effort and sensory stimuli were used, without any emotional tone.*

**Explanation of the curves.*— The numbers of the ordinates represent the number of pulse beats per minute, the abscissas represent the stimulus word or complex. The numbers above each stimulus test represent more exactly the pulse beats per minute, in reaction to the indicated tests. The numbers between each test word or complex represent the number of pulse beats per minute in the rest curve, the time interval being about a minute in each case. N. P. normal pulse, 5m.— After five minutes' abstraction. 10m.— Ten minutes' abstraction.

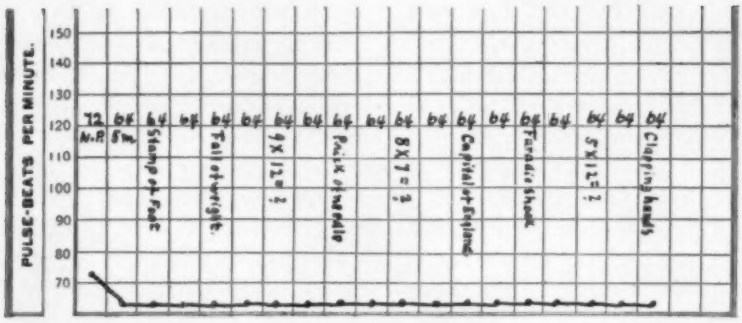

FIG. 1. NEGATIVE PULSE REACTIONS RESULTING FROM NON-EMOTIONAL STIMULI

Case I. C. W., college student, age twenty-six.—Paranoiac condition. In October, 1907, the patient broke down with nervous exhaustion and insomnia. One night, while sleeping in the *house* of one of the professors near an open *window*, he heard the voices of some passing students, and immediately began to think that they were *reading* his *mind*. Ever since this episode he has constantly believed that people were reading his thoughts, and on several occasions he has become quite irritable in reaction to these ideas. In the past he had read something about telepathy, and though he had never quite believed it, yet to a certain extent these telepathic ideas had occupied his thoughts. Four or five years previously, during a period of exhaustion following *typhoid fever*, he believed that the students were trying to haze him and writing about him in their *notebooks*. On both of these occasions he also thought the *Black Hand* Society was troubling him. In hypnosis it was possible to trace the origin of these telepathic ideas still further back. Some ten years previously he read in a *newspaper* a short article relating to the *sixth sense*, the article stating that

*In the cited cases, to avoid repetition the italicized words either cepresent exact test words used for the pulse reaction or association tests, or words having a direct relation to these. Only a brief abstract of each sase is given, the psycho-analytic details being omitted, except where necesary to elucidate the tests. Cases I and III were referred to me by Dr. Morton Prince, and I wish to take this opportunity to thank him for the privilege of reporting them.

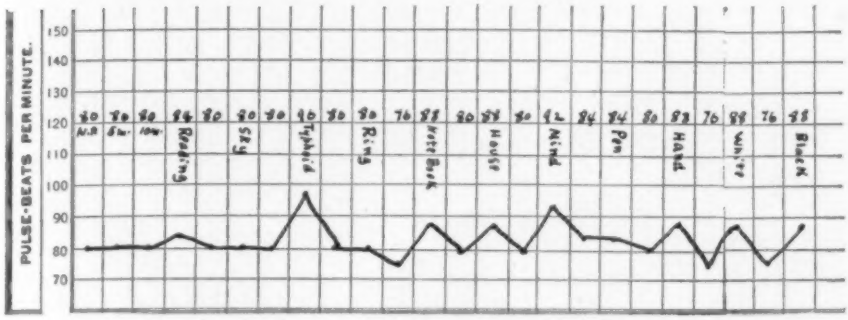

FIG. II. PULSE REACTIONS IN CASE I

thoughts could be conveyed from one mind to another without the aid of articulate speech. This experience was quite forgotten and was only obtained in the hypnotic state, yet it persisted as an unconscious residual. He accepted telepathy as a particular fact in his case alone, claiming that his mind is so constituted that people can read his thoughts. There is no special purposeful attempt to read his mind, but he feels that he is possessed of a new form of energy like a sixth sense, he can project this energy to a distance of one hundred and fifty feet, and physical obstacles do not seem to interfere with its action. The association tests are as follows. It will be observed that a lengthened association time corresponded in nearly every case with an acceleration of the pulse, when the same stimulus words were used. (See figures 2 and 3.) Indifferent test words

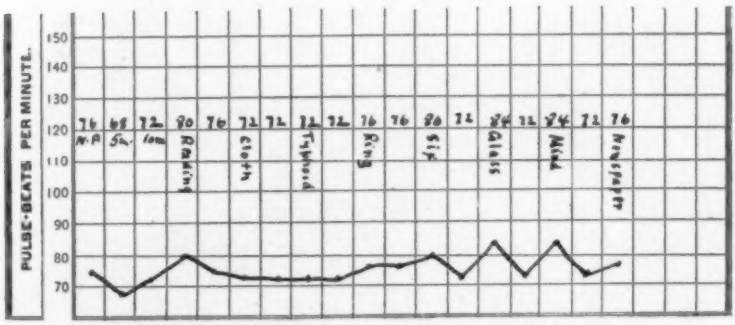

FIG. III. PULSE REACTIONS IN CASE I.

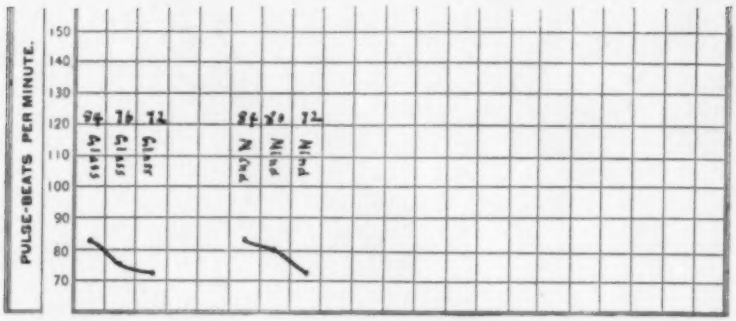

FIG. IV. PULSE REACTIONS IN CASE I SHOWING EXHAUSTION THROUGH FREQUENT REPETITION

cause no mental inhibition in the associations and no increase of the pulse rate. The exhaustion of the pulse reaction due to a frequent repetition of the same test word, is well shown in figure 4.

Stimulus Word	*Reaction Word*	*Reaction Time (seconds)*
Sky	Night	1.8
Reading	Book	2.
Cloth	Wool	1.4
Typhoid	Nurse	2.4
Ring	Diamond	1.6
Six	Clock	2.
Glass	Tumbler	1.
Mind	Reading	2.8
Pen	Fountain	1.4
Hand	White	2.4
Girl	Louise	1.2
White	Cloth	2.
King	Edward	.8
Newspaper	Times	3.8
Rain	Heavy	1.4
Note Book	University	2.4
Black	Hand	3.8

Case II. W. A., age thirty-two, teacher.— Psychasthenia. About ten years previously on one warm summer day, after a particularly fatiguing season of teaching, the patient was sitting in a *crowded church* gallery. Suddenly a peculiar feeling seemed to take possession of him. He felt that he wished to rise from his seat and scream, the jaws became set, a sense of nausea came over him, the back of the

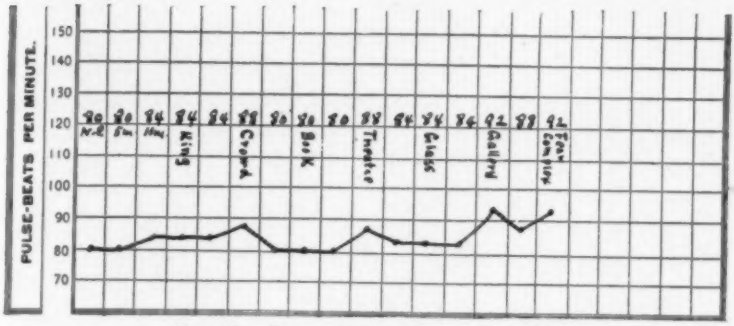

FIG. V. PULSE REACTION IN CASE II.

head felt numb, the surroundings seemed peculiar and unreal, his hands did not seem a part of himself. He immediately sought the church door, and having found an easy exit, the desire to scream disappeared. Then he began to anticipate that perhaps the same experience might recur if he again went into a crowded place, feared that he might scream and thus lead others to believe that he had suddenly become insane. As a result, he either entirely avoided crowded places, or if he went to church or theater, always sought a rear seat, so as to be near an exit. Since the first episode, if in a crowd without means of easy exit, the attack would recur in its original form. Here we have a type of case in which a morbid autosuggestion caused a mental state of fear with its accompanying physical symptoms. As a result of this suggestion the symptoms had become more or less automatic in their occurrence. Pulse curves taken at the beginning of treatment showed a marked increase of the pulse rate (8 to 12 per minute), when the patient, while in abstraction, was asked to think of the original episode (fear complex or words suggesting this episode). After a marked improvement had taken place under psychotherapeutic treatment, however, the pulse increase finally ceased to take place. The precaution was taken to allow a sufficient interval (weeks) to elapse, in order to rule out any decrease of the pulse due to frequent repetition. (See curves 5 and 6.)

Case III. Mrs. H., age forty-seven.— Psychasthenia. Three months before the origin of her present trouble, the

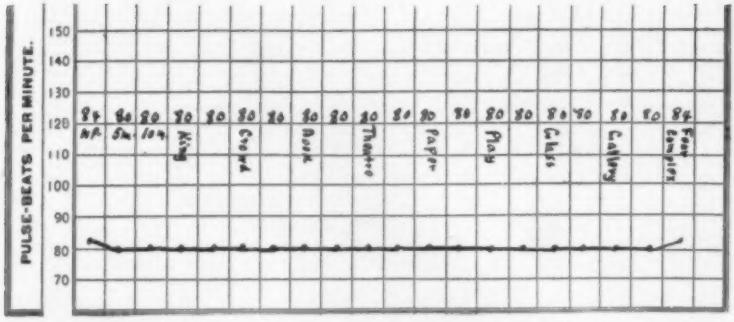

FIG. VI. PULSE REACTION IN CASE II AFTER TREATMENT

patient had the following emotional experience. Her *sister* suddenly became insane necessitating her removal to a hospital. On one occasion the sister attempted to *stab* herself, on another, she told the patient that she had thoughts of stabbing the patient's *child*. These two episodes acted as a strong emotional shokc which the patient suppressed for months, telling no one, not even her husband. Then she slowly developed the fear of injuring some one in an impulsive act, such as with a *knife*, and of even stabbing her own child. As a result she concealed every knife and sharp-pointed instrument. This fear fluctuated, sometimes slight and sometimes intense, and it was accompanied by the usual physical phenomena of fear, such as palpitation, sense of muscular tension, and tremor of the hands. On several occasions there was a transitory sense of depersonalization. When the patient was placed in abstraction, and asked to

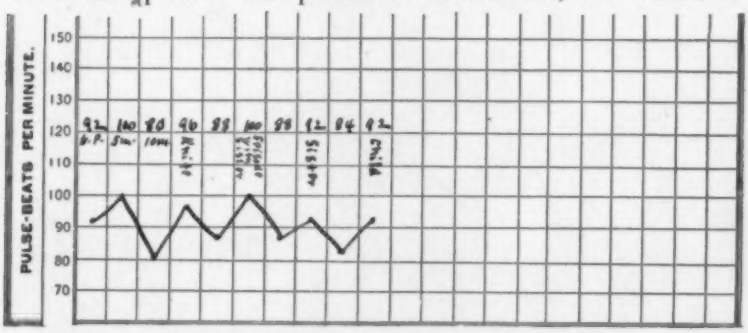

FIG. VII. PULSE REACTION IN CASE III

think of the original experience, or even of words suggesting this experience, there always resulted an acceleration of the pulse rate. Figure 7 shows the pulse reactions resulting from test words relating to the original experience.

Case IV. Mrs. M., age forty.— Psychasthenia. Following a severe surgical operation, the patient developed a neurasthenic state, during which she was removed to a country place (Sheepscot) and placed under the attendance of a physician (Dr. King). Shortly afterwards she suddenly developed nervous attacks, consisting of palpitation of the heart, cold perspiration, dryness of the mouth and tongue, abdominal distress, tremor of the hands, shortness of breath, a sense of constriction in the throat, and sometimes intestinal disturbances. The mental state associated with these physical symptoms was a sensation of fear, a " panicky feeling." The attacks occurred only when the patient was left alone, or when she expected to be left alone. In abstraction it was possible to trace the origin of the attacks as follows. While in the state of extreme fatigue incident to her neurasthenic breakdown, she heard some talk of the serious condition of a tubercular patient who lived near her cottage. One day, while the patient's husband was absent on a short journey, she was sitting by the *window* of the cottage and saw some one coming out of the door of the house opposite. It was here that the tubercular patient lived. This person carried something black, and immediately the thought flashed into the patient's mind, " He must be dead." Then suddenly some one came into the patient's room and an-

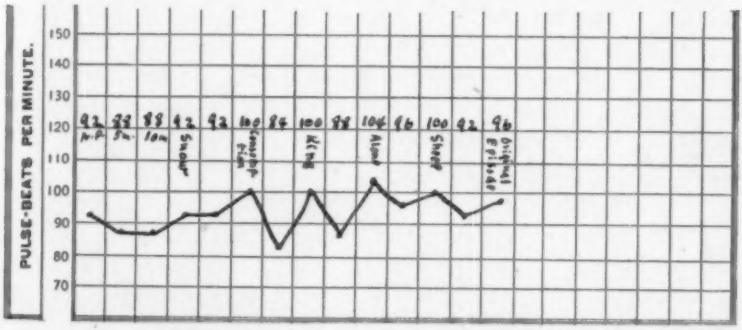

FIG. VIII. PULSE REACTIONS IN CASE IV

nounced the death of the young man who had tuberculosis. Immediately afterwards she had her first attack of fear, with all its mental and physical symptoms. The attack persisted until her husband returned the next day. Since then the same phenomena have recurred every time the patient is *alone*. She dreads the approach of winter, because a *snow storm* brings with it a sense of suffocation in connection with the fear. The pulse curve is given in figure VIII. In the association tests which follow, it will be observed that a lengthened reaction time runs parallel with an acceleration of the pulse.

Stimulus Word	*Reaction Word*	*Reaction Time (seconds)*
Card	Cards	1.8
House	Wagon	2.
Snow	No Place	6.4
Ring	My Own	3.2
Consumption	Brother	3.8
Glass	Window	8.
King	Doctor	3.8
Pen	Writing	2.8
Alone	Don't Know	8.8

Case V. Miss H. H., age thirty.—Dementia Praecox. The patient was perfectly well up to the age of twenty-eight. Then, while on a pleasure trip to Bermuda, she consulted three palmists who informed the patient, that while on this trip she would meet the person whom she would marry, although there would be considerable trouble. On her way home she became acquainted with a young engineer, thought much about him, and finally began to dream about him. One and one half years later she began to have a series of vivid dreams, heard pistol shots, once she dreamed of a certain person wearing a *black necktie*, another time of a policeman about to arrest her, that her father and mother were in *prison* for some terrible crime. Other dreams followed, such as that of being on a sinking ship, then in a rowboat alone at night, of traveling long distances on a railroad train. These dreams symbolized certain things to the patient; the dream of the black necktie meant that the engineer had committed suicide, the sinking ship meant trouble, the rowboat signified her destiny. Once she dreamed of *broken glass*, and in looking the matter up in a

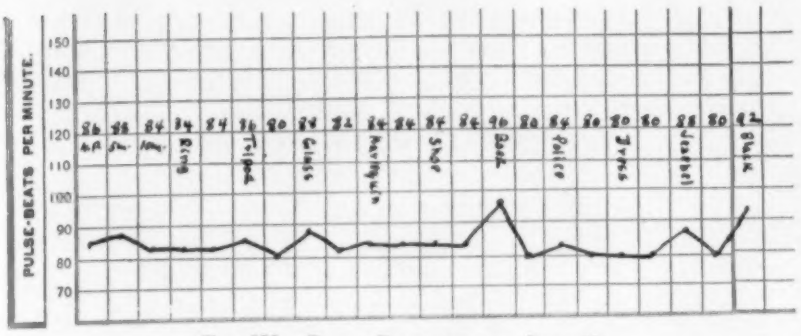

FIG. IX. PULSE REACTIONS IN CASE V

dream book she found that this dream signified trouble. Finally during the day peculiar words would suddenly flash into her mind, words that she had been unaccustomed to using, such as *tripod*, *harlequin*, *suicide*, *Jezebel*, *ineffable woe*, *ineffable joy*, etc. To these words she also attached a symbolic meaning. Finally these words took the form of voices, until the patient had auditory hallucinations of a complicated character. She claimed that the voices came from the mind of the young engineer by a kind of " mental telepathy." One day she suddenly had a convulsive attack, and she heard the voice say, " I am purified. This is the end of the old order." Other voices which she claimed came from the engineer's mind told her that she was his affinity, etc. The patient was constantly tortured by this almost constant fusillade of auditory hallucination. The association tests follow. The test words with a lengthened

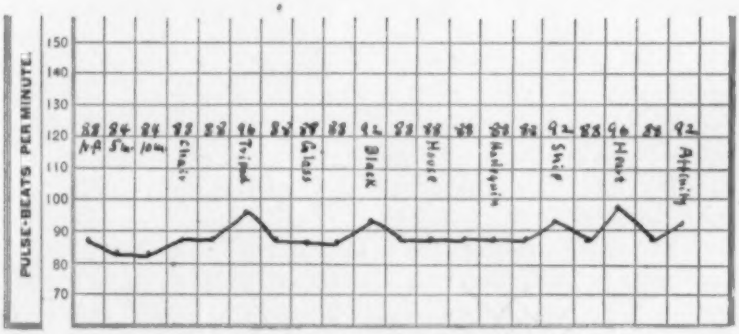

FIG. X. PULSE REACTIONS IN CASE V

reaction time correspond in nearly every case with an acceleration of the pulse when the same test word was used (figures 9 and 10). The psycho-galvanic reactions were negative.

Stimulus Word	*Reaction Word*	*Reaction Time (seconds)*
Chair	Frame	4.2
Tripod	Three	2.2
Glass	Square	2.8
Black	Darkness	4.
House	Home	1.8
Harlequin	Fowl	6.4
Ship	Ship	4.
Heart	Red	6.2
Affinity	Like	4.2
Ring	Round	2.8
Book	Vellum	2.6
Police	Uniform	3.4
Jezebel	Wickedness	4.8
Dress	Gown	3.8
Prison	Bars	8.
Joy	Happiness	2.8

Case VI. Miss M. S., age twenty-six. In another case of dementia praecox, with the formation of complexes with a strong sexual and religious coloring (emotional episodes and dreams), there resulted after a time a state of emotional apathy. The delusions based on the complexes entirely subsided after a time. The analysis of the emotional state in this patient, who was very intelligent, was most interesting. She claimed that even distressing experiences in her own family made no impression upon her, and even if she tried to work up a state of feeling in her own mind in connection with these episodes, she was unsuccessful. "I feel like a stone without feeling." Yet even in this case, the word reaction tests showed a lengthened reaction time when words pointing to the trend of her experience were used. The pulse reaction tests likewise brought forth a marked acceleration of the pulse rate, when the same stimulus words were used. As in Case I, however, frequent repetition of the stimulus word finally failed to cause any increase in the pulse rate. The word *dream* refers to a particular vivid dream which influenced to a large extent the formation of the patient's delusions. It will be impossible,

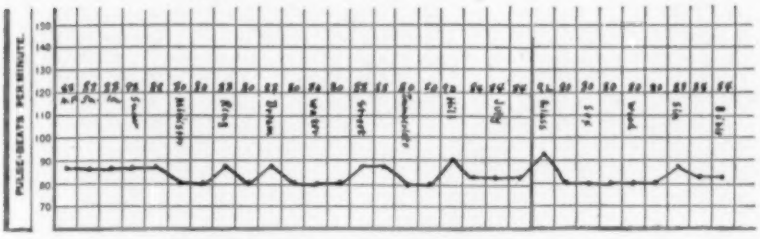

FIG. XI. PULSE REACTIONS IN CASE VI

in this case, to give a detailed account of the experiences which later formed the content of the delusion formation. It is of interest to note, however, in spite of the emotional apathy, that words associated with the patient's experiences not only showed a mental inhibition with a lengthened reaction time, but these same words caused an acceleration of the pulse rate. The experiences of the patient were preserved in the unconscious and possessed a certain amount of emotional activity. The emotional apathy was therefore only superficial, there existed a kind of an incoordination between the emotions and the ideas. (Figures 11 and 12).

Association Tests. (The italicized words are associated with the emotional complexes, and show either lengthened reaction time or pulse acceleration or both.)

Stimulus Word	*Reaction Word*	*Reaction Time (seconds)*
Snow	Coasting	1.6
Minister	Preaching	3.8
Ring	Finger	2.
Dream	Night	2.6
Water	Bridge	1.8
Street	House	2.6
Immaculate	Christ	2.
Hill	Climb	2.8
July	My Birthday	3.2
Glass	Window	2.
Sex	Girl	3.
Wood	Chair	1.
Sin	Nothing	7.6
Bible	Christ	2.6

Case VII. Mrs. F.— Psychasthenia. After a particularly fatiguing motor trip through Europe, during which the patient suffered considerably from sleeplessness and trifacial neuralgia, she suddenly had a peculiar attack

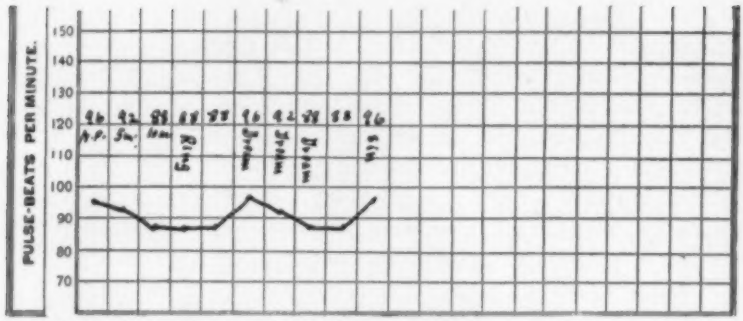

FIG. XII. PULSE REACTIONS IN CASE VI SHOWING EXHAUSTION THROUGH FREQUENT REPETITION

while in the *dungeon* of an old French chateau. In the attack she turned cold, the heart palpitated, the mouth became parched and dry, there was a sense of suffocation, and she felt that she was about to lose consciousness. When she was taken into the open air, the attack subsided. The same condition was repeated later, however, whenever she went into a close place, such as theater, church, in a passenger train, a crowded street, or in a crowded store. When the patient was placed in abstraction and asked to think of the original experience or of some word associated with this experience, the pulse rate rose from four to twenty beats a minute (see figure XIII).

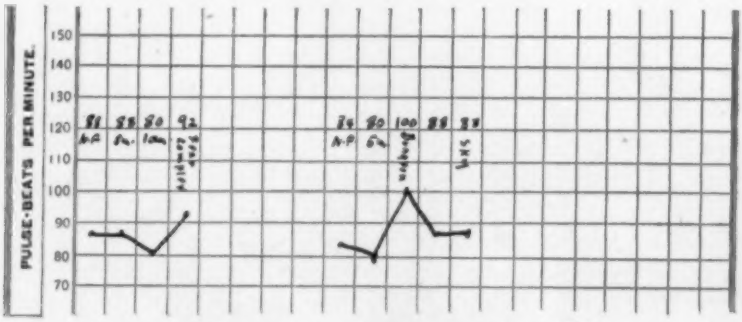

FIG. XIII. PULSE REACTIONS IN CASE VII

Case VIII. F. S., age nineteen.— Hysteria.* Only

*From the Neurological Clinic of the Boston City Hospital. Service of Dr. Knapp.

a brief outline of this case will be given, the complete details being reserved for future publication. For a number of years the patient has been subject to attacks consisting of frontal headaches, twitching of both arms, particularly the left, and palpitation of the heart. Sometimes these attacks are so severe that the patient is compelled to go to bed. The attacks followed two experiences, one sexual, the other a fright after seeing her cousin disguised in *white*, to resemble a ghost. In the sexual experience a stranger suddenly appeared at the kitchen door and asked for *food*; during this episode she struggled, bit, and was finally made unconscious through the use of chloroform. Neither of these experiences could be voluntarily recalled in the waking condition, but in hypnosis, the patient not only gave a vivid, dramatic account, but also reproduced an attack in which the arms twitched violently. On being awakened from hypnotic state, she again had no recollection of the reproduced experiences. A physical examination showed some of the stigmata of hysteria (complete hemianæsthesia and a marked concentric limitation of the visual field). The patient did not know the meaning of the test words relating to the dissociated experiences, either in the waking state, when these words were used for the association tests or in the state of abstraction, when the same words were used

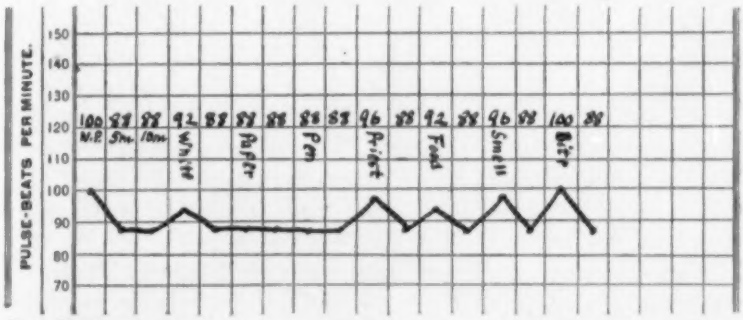

FIG. XIV. PULSE REACTIONS FROM SUBCONSCIOUS COMPLEXES IN CASE VIII

for the pulse reactions. When the association tests were used in the waking condition, there was no lengthening of the reaction time, yet these same test words cause a marked

acceleration of the pulse rate as shown in figure XIV, when the patient was placed in experimental abstraction. When the patient was hypnotized in this artificial state, where the memories of the experiences were vividly recalled, the same test words caused a marked lengthening of the reaction time. This case demonstrated that subconscious memories which cannot be voluntarily recalled in the waking condition, can cause the same physiological reactions as conscious memories.

Test Word	*Reaction Word*	*Reaction Time (seconds)*
White	Rose	.8
Priest	Holy	2.2
Food	Eat	1.4
Bite	Feeling	.8
Hand	Body	2.8
Smell	Scent	3.2

IN HYPNOSIS

Test Word	*Reaction Word*	*Reaction Time (seconds)*
White	Ghost	6.4
Priest	Man	3.8
Food	Eat	12.4
Bite	What I Did	6.8
Hand	Thing I Saw	4.
Smell	Handkerchief	6.4

In this case, after recovery through a synthesis of the dissociated experiences not only did the physical stigmata disappear and the visual field become normal, but the reaction time for the associations in hypnosis become as short as in the waking condition. Furthermore there was no acceleration of the pulse rate when the same test words were used while the patient was in experimental abstraction. The pulse curve had become a straight line, the same as in figure I, under the influence of non-emotional stimuli.

A number of other conditions, particularly cases of recurrent sensory motor attacks, the psychasthenic fear neuroses, and psycho-epileptic attacks showed an increase of the pulse rate when the subject was asked to think of either the fear complex, words associated with this complex, or the particular emotional experience which caused the pathological condition. As these patients improved under

treatment the pulse acceleration tended to become less and less, until finally a point was reached where the pulse rate was not affected. It would appear that in these pulse reaction phenomena we have one objective test of the progress of the patient's abnormal mental state.

In dementia praecox, the pulse reactions showed that the emotions were in a certain sense active, and that the emotional apathy or incoordination was only superficial. This observation is at direct variance with the absence of the psychogalvanic reactions found by some observers in some forms of this disease. In other words, the original unconscious experiences which later gave rise to the various hallucinatory and delusional phenomena of both dementia praecox and certain paranoiac states, still possesses an emotional activity as shown by the pulse reaction tests. The subjects, however, paid little or no attention to these unconscious residuals with their abnormal activities, and hence arose the emotional apathy or rather the incoordination between the emotions and the concepts.

ABSTRACTS

PERIODIC MUTISM IN SERIAL SPEECH (UEBER PERIODISCHEN MUTACISMUS BEIM REIHENSPRECHEN). *Von Dr. A. Knauer, Zentrablatt für Nervenheilkunde und Psychiatrie, Erstes Märzheft*, 1909. S. 153.

THE author describes a peculiar condition occurring in a patient suffering from a mixed phase of manic-depressive insanity and consisting in an inability to speak in an uninterrupted sequence. In this woman spontaneous speech was lost, and the patient had an initiative mutism, in Wernicke's sense. When questioned she answered slowly, monotonously, and in a low tone, but always formally and correctly. Her facial expression was strained, and she showed an unwillingness for many questions. She answered Sommer's reckoning tables correctly with few exceptions. When one questioned her about well-known facts the strained expression was lost, she became more lively and gazed at the bedclothes or at some distant object. The most careful inspection of her respiratory apparatus at such times showed no signs of speech. The facial expression remained unchanged about as long as it would take a normal person to repeat the answer; then she became expressionless again. If one reminded her that the question was yet unanswered she would declare that she had answered it.

Several times when asked to count or to name the months she showed a peculiar mixture of speech-reaction and mutism. She would name several months, suddenly become silent, after a pause begin with a month removed several places from the one at which she had stopped, then stop again and begin as before. When one observed the pauses closely they were found to be exactly as long as it would take a normal person to repeat the omitted words. The strained facial expression accompanied the spoken words and was lost in the mute period. The alphabet, for example, was repeated as follows: A B C D - - - K L M N - - - R S T - - - Y Z.

In this patient motor expression is strongly inhibited. In the reproduction of a series of words she became mute and frequently in a periodic fashion, although mentally she carried onward the sequence. She said she repeated the words although she did not speak.

Series of words which have been learned by heart are recalled in sequence much easier than unaccustomed phrases to the simple expression of which care must be given, and the will can modify the

former much more easily than it can the latter. Perhaps the woman recalled the series so distinctly mentally that she thought she really had spoken them. In this case the motor inhibition is important for the success of the deficiency. The phenomenon is closely related to dream speech in which the formation of sentences is easy but the motor expression is difficult or impossible.

The author discusses the views of Heilbronner and Cramer and then gives his own explanation of the phenomenon. The will and attention during waking periods in normal individuals are scarcely concerned with the distinct speech act, which is almost automatic, except in words and expressions which are more or less difficult, and on the motor expression of these the attention is concentrated to a greater or lesser degree. The patient had the feeling that the intensity of the speech image was not sufficient to overcome the resistance in the subcortical speech apparatus. Her attention was concentrated on the act of speech, and on that account she had a strained facial expression when talking. In repeating a series of figures this feeling of inadequacy was lost, and she did not feel that these perceptions did not automatically set the speech apparatus in action.

There may be more elementary causes at the bottom of this which Sommer has designated as the motor expression of a peculiar disposition of the nervous system which is shown in a perodic fluctuation. It raises the question whether there is not a tendency to a longer and shorter periodic fluctuation in all the actions of the nervous system. If such a fact could be proven the author thinks it would aid materially the understanding of manic-depressive insanity.

CHARLES RICKSHER

DISTURBANCE OF ATTENTION IN HYSTERIA (AUFMERKSAMKEITSSTÜRUNGEN BEI HYSTERIE). *Döblin. Arch. f. Psychiatr. u. Nervenkrankh. Bd.* xlv. Ht. 2. S. 464.

THE author uses the description of a case of hysteria to develop some general considerations on the subject of attention. The patient, a woman of thirty-two, suffered from attacks of confusion and delirium. She had a left-sided hypo-algesia, many hyperalgesic areas, and marked contraction of the visual fields. The attacks were conditions resembling both twilight states and hallucinatory delirium. In them great motor excitement occurred, and the patient cried, bit, and spoke constantly.

They lasted about an hour each, complete amnesia for the period followed. She described in them a variety of visual hallucinations of men in white (dating from the time of a gynæcological operation), dogs, landscapes, etc. In the waking state she had continuous amnesia, or rather pronounced absentmindedness, for the amnesia was imperfect. Her attention was exceedingly hard to seize and harder to retain. She failed to grasp the meaning of sentences said to her, but the last word made such a deep impression that for hours after it would ring in her ears, and often played a part in directing her conduct. The essential feature of her waking mental process was the appearance of groups of ideas which would take complete possession of consciousness to the exclusion of all else.

The chief conception developed by the author in his theoretical considerations is that of " psychical energy." This he uses in the same sense as Wernicke and Breuer, except that he categorically refuses to pass over into neurological conceptions, as these do, but keeps to the psychical facts. For him attention is not a passive process, as with the older English association psychologists, but an active one of the highest significance. To the different values in psychical energy possessed by different ideas and mental processes he attributes the lack of uniformity in our thought. In the case in question this variation in value characteristic of the normal has gone on to an excessive degree. The psychical energy of some groups of ideas is so great that they displace from consciousness all else. This he calls a psychical ataxia, and coins for it the word " dysergasia." Many of his conceptions closely resemble the principles laid down by Freud in the last chapter of his *Traumdeutung*, but he only once refers to his writings.

ERNEST JONES

THE PSYCHOPATHOLOGY AND CLINICAL STATUS OF THE ZWANG AFFECTIONS (ZUR PSYCHOPATHOLOGIE UND KLINISCHEN STELLUNG DER ZWANGSZUSTÄNDE). *By Skliar. Allg. Zeitschr. f. Psychiatr.* Bd. lxvi, Ht. 2, S. 278.

IN an article fifty-four pages long Skliar discusses this important question from many aspects. He first gives an account of five cases, two of *Zwang* inhibitions, one of *Zwang* thinking, and two of phobias. The article is chiefly of value from a descriptive and clinical point of view, though the value of even the clincial portion is diminished by being made to rest on an inadequate psychopathology. The discussion of the psychopathology proceeds along conventional lines and

shows no essential advance on Pitres and Régis's well-known work on obsessions and phobias. The reason for this is that the author has, like most authors, merely taken the symptoms at their surface value, and has not striven, as Freud has, to trace them back to their development, and thus to penetrate into its actual significance of them. He gives a grotesque caricature of Freud's views, and dismisses them with objections that disclose his profound ignorance of the principles on which those views are based. For instance, he considers it impossible that an idea or emotion dating from childhood can retain its original force, for this "fades in proportion to the time that has elapsed." This shows how deeply he has penetrated into the minds of patients suffering from hysteria, obsessions, dementia præcox, or indeed into any mind! However, perhaps it would be fairer to let our author speak for himself, and to quote the conclusions with which he terminates his article:

1. Characteristic for *Zwang* phenomena (ideas, actions, inhibitions, affect) is the lack of any emotive element as a constituent of them. In addition the patient is clearly conscious, has insight into his malady, and a feeling of compulsion.

2. *Zwang* acts differ from impulsive acts in that the latter are evoked by strong feeling, which are altogether absent in the former.

3. *Zwang* ideas differ from delusions, autochthonous ideas and *idées fixes* in that with the first named the patient has insight into his malady, while in the others he believes in the reality of his ideas; in addition the ideas are in the first named unaltered and correspond with reality, whereas in the others they are falsified.

4. The compulsions present in these conditions differ from the compulsions that occur in other pathological manifestations (e.g. hallucinations, delusions, impulses, etc.) in that it is experienced by the patient, whereas in the other conditions the patient has no feeling of compulsion.

5. The feeling of compulsion that these patients have is explained by the internal splitting, which arises from the fact that on the one hand they are clearly conscious and have to do with unaltered thinking processes, while on the other hand mechanical actions and affects occur, which dispense with an emotional basis and thus appear strange and forced to the self-consciousness of the individual.

6. The root of *Zwang* phenomena is not to be seen in a disturbance of the intellect or of the will, but is to be sought in the region of feeling, in spite of the fact that the feeling-element of them has been lost.

7. The *Zwang* states arise in that the affect produces in one case an idea, in another impulse to carry out certain actions or movements of expression. All these manifestations, which are called forth by the affect and are originally accompanied by a feeling-element, are, after the emotional element has been lost, retained and repeated, a fact to be attributed to the character of indifference which is peculiar to these patients.

8. The phobias must be quite separated from the *Zwang* states, since they have no feature in common with these, and should be grouped with the twilight states (*Dämmerzustände*) which occur principally in this form with psychopaths, with whom a strong affect evokes a disturbance of consciousness that favors the appearance of delusions.

9. We adhere in general to Westphal's definition of *Zwang* ideas, and differ from it only in that Westphal saw in them a primary disturbance of the thought function, whereas we see the origin of them in the affects.

10. Clinically we must recognize a special disease form for the *Zwang* states, since they have a characteristic onset, course, and clinical picture. We divide these psychoses into the following subgroups: (*a*) those in which principally *Zwang* actions and inhibitions occur ; (*b*) those in which the *Zwang* manifestations principally concern the sphere of thought, *folie du doute*, onomatomanic, etc., and (*c*) those in which chiefly *Zwang* affects occur.

ERNEST JONES

THE SEXUAL PSYCHOGENETIC HEART-NEUROSIS (DIE SEXUELLE PSYCHOGENE HERZNEUROSE PHRENOKARDIA). *By Privatdocent Dr. Max Herz. Wein & Leipsig.* W. Braumüller, 1909.

THOSE who are convinced of the correctness of Freud's theories are often confronted with such questions as this: "How is it that beyond Freud and his pupils no one finds the close connection between the psychoneuroses and sexuality claimed by the former?" "Seek, and thou shalt find," was the answer. Since the above question was asked there appeared two articles, one "On the Casual Relationship of Sexuality to Anxiety and Impulsive States," by Strohmeyer, reviewed for this journal by Dr. Ernest Jones, and the above named pamphlet; both authors worked independently and do not belong to Freud's school. Herz calls this morbid picture sexual because the sexual impulse plays an all-important role in its

etiology, and psychogenetic because in his opinion it is not the manifestations of the sexual impulse as such that are decisive, but the psychic alterations which accompany the same. The disease is a neurosis not so much of the heart itself as of the cardiac *region*. The pathognomontic symptoms are pain, changes in respiration, and cardiac palpitation. The pain is usually localized in the left chest and though the patient refers it to the heart its seat is definitely found to be outside of that organ; everything is in favor of its being a muscular pain, and from its relation to respiration it may be assumed that it is located in the left side of the diaphragm. Respiration is inhibited, the patient cannot breathe freely, expiration is especially difficult. To overcome this there appear at different intervals deep sighing inspirations, which are never absent in this neurosis. The third symptom, the subjective palpitation, is the only constant symptom. The author then describes the fluctuations and variations of these and the other symptoms of this neurosis, and the typical phrenocardial attack which is often mistaken for true angina pectoris. In the chapter on etiology the author shows the relationship between the sexual psychogenetic factors and the phrenocardia, and concludes that the only cause of the phrenocardia is a psychic alteration. It is "a persistent affect which may perhaps be best designated as a longing for love." Many examples are cited as illustrations.

One who is acquainted with Freud's views can readily recognize that all of the author's cases are nothing other than cases of the anxiety neurosis which Freud described about fifteen years ago. Indeed Herz states that in the psychic treatment of phrenocardia Freud's psychanalysis may do good, and mentions the case of a widower who did not respond to his treatment but who was markedly benefited by one of Freud's pupils. This pamphlet of sixty-three pages contains many points of interest, not only for the neurologist but for the general practitioner.

A. A. Brill

THE STATE OF THE BRAIN DURING HYPNOSIS. *William McDougall — Brain*, vol. XXXI. 1908.

In hypnosis the brain is in some abnormal condition and functions in a different manner from the brain in the normal waking state. We cannot understand the phenomena of hypnosis until we learn the nature of this abnormal brain state. Any

explanation must be purely psycho-physiological. According to Bernheim hypnosis is closely allied to normal sleep because the hypnotic state is brought about by the same influences and conditions, such as withdrawal of all strong sensory stimuli, restful position, monotonous, gentle stimulation of one or more of the sense organs, expectation, habit, banishment of certain thoughts, and the concentrating of attention on some unexciting object or sense impression. In hypnosis the subject is inert and passive. Catalepsy may occur in normal sleep as well as in the hypnotic state; in both these conditions the subject frequently desires to move his limbs, but is incapable of doing so. This latter condition was described by the reviewer in some studies on nocturnal paralysis. There may be a gradual transition from hypnosis to normal sleep and from normal sleep to hypnosis. No hard and fast line can be drawn, however, there is an almost imperceptible shading from one state to another. Suggestibility is absent in sleep, but is present in even the deepest hypnosis.

Considering the close analogy between hypnosis and normal sleep, the problem is to find a good working hypothesis for the state of the brain during normal sleep and to understand what peculiarities of the brain state are connected with the positive features in which hypnosis resembles sleep. Unfortunately we have no finally accepted theories of sleep. None of the theories can give an adequate answer as to how the state of the brain tissue during sleep differs from its state during waking life. We are certain of only a limited number of facts. In sleep, the nervous substance of the brain is less excitable, and compared with the waking brain, impulses are transmitted less readily from part to part. In the waking condition the brain possesses a high degree of excitability, and there is a great freedom of transmission. Therefore the state of sleep is a negative condition, it does not have the activity of the waking state. The waking state is maintained only by constant impressions of stimuli on the sense organs.

Excepting in great fatigue, which may tend to produce insomnia, the withdrawal of stimuli from the sense organs is favorable to the inducement of sleep. The continuance of sleep depends on the absence of strong sense impressions. Sleep may be terminated at any time by a sufficiently strong sensory stimulus. In the waking life brain activity is sustained by nerve energy. This nerve energy is worked off by mental activity of any kind. The human brain does not reach a state of complete rest when external stimuli are withdrawn, because the brain may still continue to be excited by ideational processes. Therefore sleep can take place only when external stimuli are withdrawn and exciting thoughts are absent.

At the synapses or junctions of the processes of the neurones, the nerve excitement is transmitted from one neurone group to another. The resistance of any synapse is not a fixed quantity, but it may be diminished by repeated stimuli, fatigue, the chemical influences of the blood, and strychnin. The resistance of the synapses is raised by fatigue and by such substances as ether, chloroform, and alcohol. This resistance of the synapses tends to fall as neurone energy rises.

In the waking state, the neurones are charged with free neurokyme (Vogt) or neurone energy, and the synapses and conduction paths are kept in a state of partially lowered resistance. In sleep the supply of neurokyme is diminished, the available amount is banked up, and therefore the resistance of the synapses rises. In the sleep which follows great fatigue and to a less extent in normal sleep without fatigue the waste products of metabolism act like chloroform or alcohol and so raise the resistance of the synapses. Now according to the author it is this general raising of synaptic resistance which throws the brain into a condition of dissociation. Normal sleep therefore implies a state of cerebral dissociation, and the many points of similarity between sleep and hypnosis also indicate that the hypnotic state is likewise a dissociation.

After this long preliminary the author then attempts to answer the question indicated in the title of his paper, namely — how does the state of the brain during hypnosis differ from the dissociation of normal sleep? The onset of hypnosis is favored by the same influences which bring about normal sleep, namely, rest, quiet, withdrawal of sensory stimuli and the banishment of emotionally exciting thoughts and expectation. In addition, in the production of the hypnotic state we have the monotonous stimulation of the sense organs and the personal contact of the hypnotizer through verbal suggestions. The monotonous stimulation constantly drains the supply of neurone energy from the sensory side of the brain. The personal contact of the operator presents the main current of neurone energy from shifting from one path to another, and therefore keeps in activity the system which underlies the presence of the consciousness of the operator. This system is therefore active and waking, it serves as an open channel through which ideas can be introduced. These ideas are then accepted uncritically. This is the basis of suggestion. With the exception of this one system all the other systems of the brain are in a state of dissociation, and it is this which explains the effectiveness of suggestion. Hypnosis is therefore nothing but a dissociation of consciousness.

The whole paper appears to us to be rather fanciful psychology. It is true that the phenomena of sleep and hypnosis touch at a few

points, but here the analogy ends. The theories adduced in this paper are far fetched, there is no evidence, experimental or otherwise, to prove the author's points. While the author objects to the phase dissociation as meaningless, confusing, and perplexing, yet he is constantly using the term. To base a psychology of hypnosis upon the theories of Forel and Semon appears to us to be unwarranted with the amount of evidence at hand, particularly when less far fetched and more tangible facts will explain the hypnotic state. The whole paper is a mass of confusing and ill-arranged material and theories.

I. H. CORIAT

REVIEWS

A TEXT-BOOK OF EXPERIMENTAL PSYCHOLOGY. *By Charles S. Myers, Lecturer in the University of Cambridge, and Professor in King's College, University of London.* New York, Longmans, Green & Co., 1909. pp. xvi, 432.

THIS volume fills, so far as I know, a rather unique place in psychological literature. It is not, in the first instance, a manual of laboratory exercises or experiments, as the title might suggest. The book consists primarily of a statement, at once critical and impartial, of the results which have been achieved in experimental psychology. Only by way of an appendix, covering something less than a hundred pages, are practical exercises introduced. The aim of the book, as we are told, is "to describe the methods and principles of psychological experiment, and to set forth the most important results that have been attained in that field." General or "systematic" psychology is not gone into explicitly, though, as is pointed out, some acquaintance with that aspect of the subject must be presupposed.

In an introductory chapter the standpoint of experimental psychology is considered, and the science is defined as one which is concerned with "the responses of individuals to prescribed conditions," and more specifically with "those responses which throw light on the analysis and the course of mental states." The close relation between experimental and physiological psychology, especially in the study of sensation, is insisted upon; but, as is indicated by the author, important discoveries have been made by experimental psychology, in regard to memory, comparison, and mental work, which are at present wholly devoid of physiological basis.

Chapters II-IX discuss the sensations; the cutaneous and visceral, the auditory, the labyrinthine and motor, the visual, and the gustatory and olfactory; and in each case physiology and physics, when available, are drawn on quite as freely as psychology. The recent work of Dr. Head, concerning the two systems of cutaneous sensibility, is reviewed. The pros and cons of Helmholtz's theory of hearing are considered, together with the views of Rutherford, Ewald, and Max Meyer. Similarly the Young-Helmholtz and the Hering theories of color vision, with their more recent modifications, are discussed. Professor Myers, however, is not satisfied merely to state conflicting theories and to leave things standing at loose

ends. While refraining from precipitous or radical speculations of his own, he brings together the best established facts and discusses the theories in the light of the data thus attained. The thoroughly empirical standpoint of the book is well illustrated by the author's comment on Wundt's analysis of the consciousness involved during reduced or central reaction time, as made up of the three different processes, perception, apperception, and volition.—"This conception, however, is schematic instead of actual, philosophical instead of psychological. It is the outcome of *a priori* notions, rather than of an appeal to introspection (p. 135)."

After the treatment of sensations come discussions of specific energy, statistical methods, reaction times, memory, muscular and mental work, psycho-physical methods, weight, local signs, sensory acuity, experience of identity and difference, binocular and binaural experience, visual perception of size and direction, time and rhythm, attention, and feeling. The chapters on statistical and psycho-physical methods give a clear and concise account of a rather diffuse and scattered subject-matter. Especially good is the version of Weber's law and Fechner's speculations. In commenting on Fechner's scheme for measuring sensations, the author observes that this theory rests on the unwarranted assumption that an experience of difference can be taken as a difference between two experiences; and points out that, in fact, we cannot measure subjective experiences, but only the objective intensities or extents of stimuli which produce these experiences. "Indeed we are powerless to measure sensation strengths at all. . . . We cannot divide a sensation into equal unit sensations (p. 263)." Other factors as well as Weber's law, as Professor Myers shows at considerable length, are operative in determining our judgments of identity and difference.

This book impresses the reviewer as an unusually careful and judicious account of the facts, methods, and theories which make up the youthful science of experimental psychology. Its usefulness for teaching purposes might, indeed, have been increased by a somewhat more elaborate and detailed description of laboratory procedure. It is as a critical statement of the results of experimental psychology that the book is especially valuable. Well chosen bibliographies are added at the ends of the various chapters.

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LA COUCHE OPTIQUE (ÉTUDE ANATOMIQUE, PHYSIOLOGIQUE ET CLINIQUE) LE SYNDROME THALAMIQUE. *Par le Dr. Gustave Roussy.* Paris, G. Steinheil, Editeur. 1907.

IT is obvious from a perusal of this volume that the author has spared himself no pains to make his work as complete as the present state of knowledge — anatomic, physiologic, and semeiologic — upon his chosen subject permits. The result is a comprehensive work of reference of three hundred and seventy-one well-printed pages, valuable to the specialist.

Particularly worthy of mention is the nice sense of proportion displayed by Roussy from beginning to end. In his opening section he exposes in historic review the work of other experimental investigators in the same field, and draws attention to the striking opposition of existing views, particularly with regard to the functions of the thalamus. He follows this with an anatomic consideration which is not merely descriptive of the ganglion itself, but includes all its known relations.

In the section devoted to animal experimentation the author shows that the value of conclusions drawn from the work already done in this line is considerably vitiated by the use of faulty technique, makes valuable suggestions as to the proper choice of animals, and describes in detail his own careful methods.

The clinical portion of the work also opens with a brief historical consideration. After this come a detailed description of symptoms and a lucid exposé of diagnostic data. Four personal clinical observations, with necropsies, are reported in detail from both points of view, and in connection with these, as well as in the section on animal experimentation, one finds satisfactory illustrative plates, some in colors.

As a result of his extensive historical researches and his anatomic, experimental, and clinical studies the author arrives at conclusions, which are of three orders: anatomic, physiologic, and semeiologic. Of these, lack of space permits us to reproduce the last mentioned only. They are as follows: "In man, foci of hemorrhage or of softening, sufficiently limited to permit survival for a certain period of time, bring about notable and persistent alterations of sensibility. They are manifest in part by objective disturbances: *hemianesthesia, both superficial and deep — the latter by far the more marked — with loss of the muscular sense and astereognosis;* and in part by subjective disturbances: *pains of central origin.* From the objective sensory disturbances results *hemiataxia.*

"In the overwhelming majority of cases, these foci of softening or hemorrhage are not stricly limited to the thalamus, but also invade

a portion of the posterior segment of the internal capsule and thus cut off a certain number of fibers of the motor pathway.

" When the lesion thus occupies the posterior portion of the optic thalamus, where it destroys, to a greater or less extent *the posterior third of the nucleus externus, a portion of the nucleus internus, of the centrum medium and of the pulvinar*, and involves only a few fibers of the posterior segment of the internal capsule, we have presented the clinical picture known as " *the thalamic syndrome.*"

" This syndrome, which is to-day worthy of a place in nosography, is characterized by:

1. A persistent superficial hemianesthesia, of organic character, more or less marked as regards superficial forms of sensibility (touch, pain, temperature), but always very pronounced as regards the deep varieties.

2. A slight hemiplegia, always without contracture and rapidly regressive.

3. Slight hemiataxia and more or less complete astereognosis.

4. Sharp pains on the hemiplegic side, which are paroxysmal, of long duration, often unbearable, and unyielding to all available forms of analgesic treatment.

5. Choreo-athetoid movements in the limbs of the paralyzed side.

" Of these different symptoms, the objective sensory disturbances (from which come the hemiataxia and the astereognosis) as well as the pains result from the principal lesion — the *thalamic;* the motor disturbances (hemiplegia and choreo-athetoid movements) from the accessory lesion — the *capsular.*"

An extensive bibliographic index closes this important contribution to a subject of great scientific and clinical interest.

J. W. COURTNEY